

ABSTRACT

Precise timing control can be obtained for a gas discharge laser, such as an excimer or molecular fluorine laser, using a timed trigger ionization. Instead of using a standard approach to control the timing of the emission or amplification of an optical pulse using the discharge of the main electrodes, the timing of which can only be controlled to within about 10 ns, a trigger ionization pulse applied subsequent to the charging of the main electrodes can be used to control the timing of the discharge, thereby decreasing the timing variations to about 1 ns. Since ionization of the laser gas can consume relatively small amounts of energy, such a circuit can be based on a fast, high-voltage, solid state switch that is virtually free of jitter. Trigger ionization also can be used to synchronize the timing of dual chambers in a MOPA configuration. In one such approach, ionization trigger can include at least a portion of the optical pulse from the oscillator in a MOPA configuration.